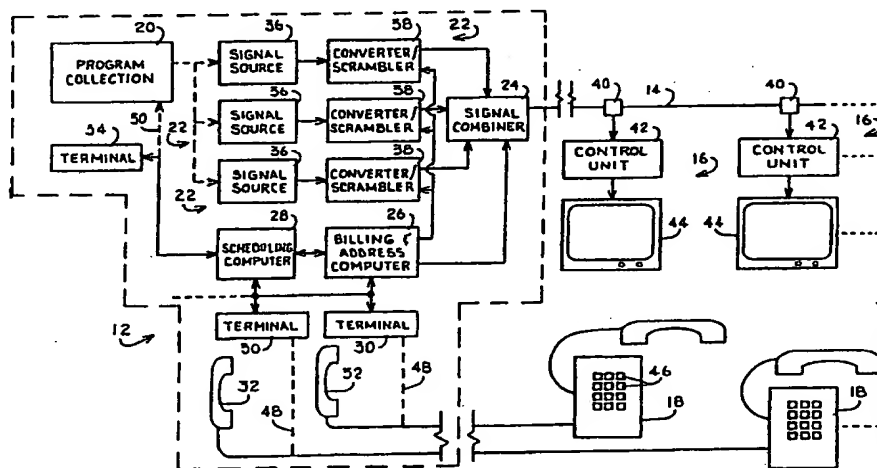




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(54) Title: TELEVISION BROADCAST SYSTEM FOR SELECTIVE TRANSMISSION OF VIEWER-CHOSEN PROGRAMS AT VIEWER-REQUESTED TIMES

A television broadcast system using land lines (14) is provided for real-time transmission of a viewer-chosen program at a viewer-requested time to the requesting viewer's television receiver (16). The preferred method includes the steps of providing a collection of stored programs (20), communicating the requesting viewer's choice of a program chosen from the collection (20) and a requested time for viewing the chosen program, selecting the chosen program from a collection (20), transmitting the chosen program at the requested time for viewing on the requesting viewer's receiver (16), and preventing intelligible viewing of the chosen program on other of the re-



ceivers (44), other than that which specifically requested the program selection. The preferred system (10) includes a central unit (12), land lines (14), a plurality of viewer-associated receivers (16), and a plurality of viewer-associated telephone handsets (18). Customers can communicate with customer service representative at telephone units (32) at the central station (12). Alternatively, customers can use their telephones (18) to communicate directly with the scheduling computer (28). The signal sources (36), the converter/scramblers (38), and the signal combiner prepare the plurality of requested programs for transmission over land line (14). Billing and addressing is controlled by billing and address computer (26).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FI	Finland	ML	Mali
AU	Australia	FR	France	MR	Mauritania
BB	Barbados	GA	Gabon	MW	Malawi
BE	Belgium	GB	United Kingdom	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IT	Italy	RO	Romania
BJ	Benin	JP	Japan	SD	Sudan
BR	Brazil	KP	Democratic People's Republic of Korea	SE	Sweden
CF	Central African Republic	KR	Republic of Korea	SN	Senegal
CG	Congo	LJ	Liechtenstein	SU	Soviet Union
CH	Switzerland	LK	Sri Lanka	TD	Chad
CM	Cameroon	LJ	Luxembourg	TG	Togo
DE	Germany, Federal Republic of	MC	Monaco	US	United States of America
DK	Denmark	MG	Madagascar		
ES	Spain				

- 1 -

1 TELEVISION BROADCAST SYSTEM FOR
 SELECTIVE TRANSMISSION OF VIEWER-CHOSEN
 PROGRAMS AT VIEWER-REQUESTED TIMES

5 Background of the Invention

 1. Field of the Invention

 The present invention relates to a commun-
 ity antenna television (CATV) system. More particu-
 larly, the present invention relates to a system in
10 which a viewer can choose a program and request a
 time for viewing of the chosen program on the view-
 er's television receiver.

 2. Description of the Prior Art

 With over half the homes in the United
15 States now equipped with video cassette recorders, a
 major industry has developed which includes thou-
 sands of video stores for renting movies and other
 programs on video cassettes in order to satisfy a
 demand for over three billion rentals a year. One
20 of the reasons video tape cassette rentals have
 become so popular is that the viewer can rent a
 desired program cassette from the video store's
 assortment and then view that program whenever
 desired. This is in contrast to conventional broad-
 cast television or premium cable television in which
25 the viewer neither chooses the program being trans-
 mitted nor the time at which it is transmitted.

 Even with the advantages of cassette rent-
 al, certain problems are apparent. For example, the
 viewer must make a first round-trip to the video
30 store to pick up the desired program cassette and
 then make a second round-trip to return the cas-
 sette. Additionally, the viewer may make a trip to
 the video store only to find that the movie is
 unavailable either because all of the available

- 2 -

1 copies have already been rented, or that particular
video store does not stock the desired movie. If
such occurs, not only is the viewer inconvenienced,
5 but the video store also loses potential rental
revenue.

Furthermore, the existing system for
renting video cassettes presents some inherent
inefficiencies. For example, in order to minimize
inconvenience to the customer, the video store must
10 be located at a premium, high rent, location such as
a corner intersection or a shopping mall and pay the
high rent associated with the premium location.

Second, each video store must carry a
complete library of video taped programs most of
15 which are unused at any given time. For example, it
a video tape store may carry an inventory of over
5,000 program titles representing thousands more
video cassettes owing to the duplication of many of
the titles. The inventory problem is magnified if
20 duplicate cassettes are stocked in VHS and BETA
formats. At any given time, however, only a rela-
tively small percentage of the titles will be rented
which are typically the currently most popular pro-
grams. Even with such a large inventory, the video
store can satisfy relatively few requests for the
25 most popular programs. That is to say, even if a
number of copies of a currently popular program are
in stock, the demand for this program may far exceed
this number of copies and potential revenue is lost
while other titles lie idle.

30 Third, the inventory problem for video
rental stores is a growing one in that new titles
are released to the video market each month with the
result that the number of titles in a video store's
inventory grows by at least this amount each month.

35

- 3 -

1 The physical space required to store these addition-
al titles may grow at an even faster rate because
more than one copy of each title may be purchased.
In order to handle the ever increasing number of
5 cassettes, the video store must increase its storage
capacity for which it must pay a higher rent because
of the store's premium location.

 In order to solve some of the problems
associated with the video cassette rental industry,
various prior art solutions have been proposed. For
10 example, Patent No. 4,506,387 which is hereby incor-
porated by reference discloses a system in which a
cable television system (CATV) may download a re-
cording from a central location over its cable trunk
line to a memory module included in the viewer's
15 television receiver. The program is downloaded in
non-real time, typically in about 30 seconds, and
the viewer then activates the memory module to view
the program stored therein. The '387 patent pre-
sents some disadvantages, however, in that the
20 central location must be equipped to download the
program in non-real time. Additionally, each view-
er's receiver must be equipped with a memory module
to store the downloaded program. Such equipment may
be prohibitively expensive and may be also ineffi-
25 cient in that a viewer's receiver must be properly
equipped even though a particular viewer may seldom,
if ever, desire to take advantage of the capability.

 Patent No. 4,381,522 which is hereby
incorporated by reference discloses a system in
30 which a viewer can telephone the cable company's
central location and electronically select a spe-
cialized recording such as a commercial advertise-
ment for broadcast over one of the unused channels
of the cable television system. A computer then

35

- 4 -

1 schedules the program, transmits it at the scheduled
time, and separately transmits a directory of all of
the scheduled programs on another unused channel.
The viewer then observes the directory channel to
5 see when the requested recording is scheduled, and
then turns to the channel indicated at the scheduled
time to view the program. The provision of the
directory channel encourages other viewers to view
one of the scheduled recordings also. The system as
10 disclosed in the '522 patent does not allow the
viewer to determine when the program is to be sche-
duled and furthermore provides no means by which
receivers other than the one of the requesting
viewer are prevented from viewing the scheduled
15 program.

Summary of the Invention

The present invention solves the problems
as outlined above. The invention hereof allows a
viewer to choose a program from a collection and to
20 view that program at a viewer-requested time on the
viewer's receiver for which the viewer is billed and
which also prevents non-requesting viewers from
intelligible viewing of the chosen program on their
associated receivers. This allows a viewer to
25 "rent" a program without the need for a VCR.

The present invention is advantageously
and preferably implemented in the context of a tele-
vision transmission system, typically a CATV system,
which uses land lines such as coaxial cables or
30 fiber optic cables for transmitting programs to a
plurality of subscriber's receivers. Preferably,
the television transmission system is an "address-
able" system in which selected programs are scram-
bled to prevent intelligible viewing thereof and in

35

- 5 -

1 which a descrambling signal can then be addressed to
the receiver associated with the requesting viewer
which in turn prompts the included control unit to
descramble the program transmission for viewing on
5 that receiver.

The preferred method of the present invention involves the steps of providing a collection of stored programs, selecting a program chosen from the collection for transmission at a requested time in response to a request from a viewer, transmitting the chosen program in real-time over the system's land lines at the requested time, and preventing intelligible viewing of the chosen program at the requested time by receivers other than the requesting viewer's receiver. More particularly, the preferred method includes the steps of scrambling the transmission of the chosen program and transmitting decoder signals to the requesting viewer's receiver in order to allow intelligible viewing of the chosen program thereon only by the requesting viewer and thereby preventing intelligible viewing by others.

15 Additionally, the preferred method also includes the steps of transmitting the chosen program at the requested time over a selected channel and communicating the identity of the selected channel only to the requesting viewer.

25 In preferred forms, the method hereof includes the steps of transmitting address signals specific to the control unit associated with the requesting viewer and transmitting associated descrambler signals specific to the selected channel over which the chosen program is being transmitted.

30 Advantageously, the preferred method includes the steps of identifying a section of the

35

- 6 -

1 land lines having a subset of receivers operably
coupled thereto, transmitting the chosen program
over the section of the land lines, identifying a
5 juncture between the section and the remaining
portion of the land lines, and preventing transmis-
sion of the chosen program therebeyond by use of a
blocking device located at the juncture.

The preferred apparatus includes a collec-
tion of stored programs, means for selectively
10 choosing certain ones of the programs for transmis-
sion, means for transmitting a chosen program at a
requested time, and a scheduling computer for sche-
duling program choices and requested times. The
preferred apparatus also includes computer means for
15 receiving information from the requesting viewer as
encoded signals preferably over telephone lines
using telephone touch-tones. In especially prefer-
red forms, the computer means is equipped for voice
communication with the requesting viewer either in
20 the form of synthetically generated voice signals or
prerecorded selected messages.

Other preferred aspects of the present
invention are explained hereinbelow.

Brief Description of the Drawing Figures

25 Figure 1 is schematic illustration of the
preferred configuration of the present invention;

Fig. 2 is a schematic illustration showing
the preferred interconnection between the configura-
tion of Fig. 1 and sections of the transmission
30 system.

Detailed Description of the Preferred Embodiments

The present invention is preferably imple-
mented in the context of a conventional community
35

- 7 -

1 antenna television (CATV) system, the equipment and
operation of which are well understood by those
skilled in the art and which are explained in part
in the Electronics Engineer's Handbook, Second
5 Edition, which is hereby incorporated by reference.

Preferred system 10 (Figs. 1) includes
central unit 12, land lines 14, a plurality of
viewer-associated receivers 16, and a plurality of
viewer-associated telephone handsets 18.

10 Central unit 12 includes program collec-
tion 20, a plurality of signal transmitters 22,
signal combiner 24, billing and address computer 26,
scheduling computer 28, a plurality of input data
computer terminals 30 having associated telephone
15 units 32, and output schedule computer terminal 34.

Program collection 20 includes a plurality
of programs stored on a medium allowing selective
reproduction and real-time transmission thereof over
land lines 14 for reception by and viewing on re-
ceiver 16 by an associated viewer. Preferably, the
20 programs stored in collection 20 are stored on 3/4"
video tape which allows for higher fidelity repro-
duction than conventional 1/2" video tape. Each
program is preferably assigned and labeled with a
catalog number, a list of which is stored in sche-
duling computer 28. Preferably, up to three copies
25 of selected programs are included in collection 20
which to allow continuous transmission of ninety-
minute programs at half-hour intervals if desired
for currently popular programs.

30 As those skilled in the art will appreci-
ate, the programs in collection 20 can be stored on
a variety of media including compact disks, floppy
disks, hard disks, conventional magnetic tape, elec-
tronic memory such as that disclosed in U.S. Patent

- 8 -

1 No. 4,506,387, or the like. While storage on video
tape is preferred, available technology and economic
factors may dictate an alternative storage medium.

5 Signal transmitters 22 are conventional
units commonly found in the "head end" of a typical
CATV system. Signal transmitter 22 includes signal
source 36 and converter/scrambler unit 38.

10 Signal source 36 in a typical CATV system
is the origination point for signals received by way
of antenna, microwave, land lines from a local
television station, or a video cassette recorder
(VCR). Preferred signal source 36 includes a 3/4"
video cassette recorder (VCR) operable to receive
and play video cassettes selected from collection 20
and to produce signals representative thereof for
15 presentation to converter/scrambler unit 38.

Conventional converter/scrambler unit 38
receives signals from signal source 36 and converts
those signals for output on a predetermined fre-
quency channel. In a conventional system, these
20 channels include low band, mid-band, high band,
super band, and hyper band, which, depending upon
the design of the system, may allow selection of up
to seventy different channels for program trans-
mission on a single coaxial cable trunk line. In
25 the preferred system, unit 38 is operable to selec-
tively scramble program transmissions.

Conventional signal combiner 24 receives
the output signals from transmitters 22 on the
various channels and combines those signals for
30 transmission over land lines 14. Signal combiner 24
is also typically coupled with conventional billing
and address computer 26.

Computer 26 is operable to transmit decod-
er signals by way of signal combiner 24 onto land
35

- 9 -

1 lines 14 and thereby to receivers 16 which allows
intelligible viewing of scrambled program transmis-
sion on selected ones of receivers 16 and prevents
intelligible viewing on others. That is to say,
5 computer 16 keeps track of which viewers which have
subscribed to certain premium channels such HBO, and
periodically transmits decoder signals which include
address signals specific to receivers 16. Descram-
bling signals are typically associated with the
10 address signals which prompts the addressed receiver
16 to descramble the transmissions identified by the
associated descrambler signals. Receivers 16 which
do not receive descrambling signals associated with
their respective address signals prevent intelli-
gible viewing of the scrambled program transmission.

15 Computer 26 is also operable for producing
billing information as appropriate for the services
to which the individual viewers have subscribed. As
those skilled in the art will appreciate, the vari-
ous functions performed by computer 26 may be per-
20 formed by separate computers.

Scheduling computer 28 is preferably a
minicomputer and is operably coupled with terminals
30, with computer 26, and with terminal 34. As will
be explained further hereinbelow, computer 28 re-
25 ceives data representative of the program choices
and requested times for viewing thereof and presents
outputs at terminal 34 whereby the chosen program
can be selected from collection 20 for transmission
by the respective signal transmitter 22 at the
30 requested time.

In one embodiment, viewers communicate
their program choices and requested viewing times by
way of conventional telephone handsets 18 connected
through the local telephone network. Respective

35

- 10 -

1 customer service representatives answer the incoming
calls over phone units 32 and then enter the infor-
mation communicated from the viewers into scheduling
computer 28 by way of respective terminals 30, each
5 of which includes a conventional data entry keyboard
and monitor.

Land lines 14 typically include coaxial
cables which transmit the programs from program unit
12 to receivers 16. Receivers 16 are conventially
10 coupled with land lines 14 by way of respective
cable taps 40.

Receivers 16 each include control unit 42
and television 44. Control unit 42 converts a
program transmission received from land lines 14 on
15 one of the various transmission channels to an
output on a preselected channel for reception by
television 24.

Control unit 42 is also operable to selec-
tively descramble certain of the transmissions
received by way of land lines 14 from central unit
20 12. Each control unit 42 is equipped to receive
decoder signals to detect its specific address
signal from computer 26 and in response to descram-
ble the transmission identified by the descrambling
signals associated with the address signals.

25 In the preferred method of operating
system 10, each subscribing household is provided
with a catalog of the programs included in collec-
tion 20 along with the associated program identifi-
cation number by which scheduling computer 28 iden-
30 tifies the program and by which they are labeled and
stored in collection 20. Preferably, monthly sup-
plements to the program catalog are provided as new
programs are added to collection 20 and new catalogs
are periodically issued incorporating the previous

35

- 11 -

1 supplements as needed. The program listings in the
catalog are preferably arranged alphabetically and
also by subject category to facilitate selection of
5 a desired type of program. Collection 20 includes
full-length movies, recordings of previously trans-
mitted regularly scheduled commercial broadcasts and
other programs of interest to the subscribers. Each
subscribing household is preferably provided with a
confidential identification number in order to prevent
10 unauthorized ordering and thereby billing of a
program.

After a viewer has chosen a program, the
viewer then uses telephone handset 18 to place a
telephone call over the conventional telephone
15 network to the telephone number associated with
central unit 12. Customer service representatives
answer the incoming telephone calls to whom the
viewer communicates the program choice and requested
time along with the viewer's name and confidential
20 identification number. The customer service repre-
sentative then enters this information by way of
terminal 30 into computer 28.

In accordance with conventional computer
programming techniques well known to those skilled
in the art, computer 28 first determines whether the
25 viewer's name and identification number match. If
not, this fact is communicated to the representative
who informs the viewer that the request cannot be
satisfied without a correct match. If the customer
name and identification number do match, computer 28
30 then determines whether the chosen program has been
already previously scheduled at the requested time.
If such is the case, computer 28 need not reschedule
the chosen program, but rather needs only prompt
address computer 26 to transmit proper decoding

35

- 12 -

1 signals to the viewer's control unit 16 at the
requested time to allow the viewer's receiver to
descramble the program and to enter the billing
information.

5 If the chosen movie has not been previous-
ly scheduled at the requested time, computer 28
determines whether a channel is available at the
requested time. If yes, computer 28 selects an
10 available channel and schedules this channel for
transmission of the chosen program at the requested
time. Computer 28 then presents confirmation of
this to the customer service representative on the
monitor associated with terminal 30 along with the
channel number which is then communicated to the
15 viewer.

Computer 28 provides scheduling informa-
tion as output by way of terminal 34. In the pre-
ferred form, an operator reads the output from
terminal 34 either presented on an associated moni-
tor or as a hard copy print out. In response, the
20 operator selects the chosen program from collection
20 and inserts into the appropriate VCR included in
signal source 36 which is associated with the sche-
duled channel. That is to say, each transmitter 22
is associated with a specific output channel and the
25 information provided from computer 28 by way of
terminal 34 instructs the operator which VCR is to
be used for transmitting the chosen program at the
requested time. In the alternative, system 10 could
be arranged such that any unused signal transmitter
30 22 can be selected and then adjusted to transmit on
the scheduled channel. At the requested time the
operator activates the appropriate VCR in order to
transmit the program which is scrambled and convert-

35

- 13 -

1 ed by unit 38 and presented on the selected channel
to signal combiner 24 and onto land lines 14.

5 Computer 28, upon scheduling the chosen
program at the requested time, also interacts with
computer 26 so that computer 26 sends appropriate
decoder signals at the requested time and during
transmission of the program to receiver 16 associ-
ated with the requesting viewer. The decoder sig-
nals include address signals specific to control
10 unit 16 associated with the requesting viewer and
prompts control unit 42 to descramble the chosen
program in accordance with the descrambler signals
associated with the address signal. In this way,
the requesting viewer can view the program on the
viewer-associated television 44. By scrambling the
15 transmission, and by not providing a descrambling
signal to other receivers, subscribers other than
the requesting viewer are prevented from intelli-
gible viewing of the chosen program.

20 Upon transmission of the chosen program at
the requested time, billing and address computer 26
is programmed to automatically add the specified
program charge to the requesting viewer's monthly
bill.

25 If there are no available channels at the
requested time, computer 28 is preferably programmed
to determine the nearest available time frame during
which a channel is available or to determine the
nearest available time when the chosen program is
already scheduled for transmission. This informa-
30 tion is then presented to the customer service
representative on terminal 30 who in turn communi-
cates this information to the requesting viewer who
may thereupon select one of the alternative times.
For example, if the requesting viewer wishes to see

35

- 14 -

1 a very popular program at a certain time, and all of
the channels are already scheduled for that time,
none of which include that chosen program, an unused
channel may be available shortly before or after the
5 requested time or the chosen program may be already
be rescheduled at a nearby time whereupon the re-
questing viewer can select one of these.

As discussed above, scheduling computer 28
is programmed to ensure that the viewer's identifi-
10 cation number matches the name of the requesting
viewer, or the requesting viewer's address, and so
forth. As a further check, computer 28 can be pro-
grammed to also include the requesting viewer's
telephone number, and upon being provided with this
15 information, can double check this against the
confidential identification number and the request-
ing viewer's name and address. This provides addi-
tional assurance that unauthorized persons do not
schedule programs which would be billed against
another subscriber's account.

20 As those skilled in the art will appreci-
ate, the requirement for a customer service repre-
sentative to answer telephone 32 can be eliminated
by the provision of a so-called "auto-dial" device
which would allow the requesting viewer to communi-
25 cate directly with scheduling computer 28 by provid-
ing appropriate encoded signals such as those pro-
vided by buttons 46 as touch-tone signals from
telephone handset 18. Such systems are well known
to those skilled in the art and are commonly used in
30 banking services whereby customers can conduct
transactions with their financial accounts. Such
systems often include voice response systems which
can be incorporated in computer 28 to provide verbal
messages by way of synthesized voice or prerecorded

35

- 15 -

1 verbal messages. The requesting viewer can respond
to inquiries by the computer by entering the appropriate codes on push buttons 46. Such an interconnection with computer 28 by way of terminal 30 is
5 indicated by the dashed lines 48.

Those skilled in the art will also appreciate that the information from the requesting viewer can be communicated to central unit 12 by using land lines 14 such as with an interactive
10 cable system. Such systems are well known such as those described in U.S. Patent Nos 4,290,142, 4,408,345, and 4,710,955 which are hereby incorporated by reference.

As discussed above in connection with U.S. Patent No. 4,506,387, program collection 20 can
15 include programs stored in electronic memory. If such is preferred, computer 28 can be connected directly with collection 20 as represented by line 50. In addition, collection 20 can be directly
20 coupled with signal sources 36 as illustrated by lines 52. With such an arrangement, the requirement for an operator to physically select the programs from collection 20 and in to insert them in the appropriate VCR is eliminated. That is to say, upon
25 instructions from scheduling computer 28, collection 20 is operable to cause the chosen program to be transmitted directly to the appropriate signal source 36 for the scheduled channel at the requested time.

While the present invention is discussed
30 in the environment of a conventional CATV system using coaxial cables such as land lines 14, the present invention is also useful in the context wherein land lines 14 are fiber optic cables or telephone lines. Fiber optic cables have the capa-

35

- 16 -

1 bility of carrying many more channels than a coaxial
cable with repeaters spaced further apart and with
somewhat greater immunity to external noise. In
such a system, conventional telephone communication
5 may also be provided over such a fiber optic cable
or, in the alternative, a separate key pad, key-
board, or the like can be included as part of re-
ceiver 16 whereby the requesting viewer can enter
data representative of the chosen program and
10 requested time for transmission over the land lines
14 directly to computer 28.

A typical cable television system using a
coaxial cable as a trunk line may have upwards of
fifty channels unused for regularly scheduled trans-
missions. With the potential for a thousands of
15 receivers connected to the system, fifty unused
channels may not be adequate to supply the demand
viewer-chosen program viewing. It should be appre-
ciated, however, that in this example, fifty avail-
able channels can still satisfy the program choice
20 demands of many thousands of subscribers. For
example, fifty channels transmitting the fifty most
popular programs of the day may satisfy up to 80% of
the program requests. It would not be unexpected
that many subscribers may request the most popular
25 program. This, coupled with the fact that all of
the subscribers will not likely be requesting movies
at the same time, may allow fifty available channels
to serve many subscribers.

Nevertheless, there may be some upper
30 limit as to the number of subscribers that the
available channels can adequately serve. In order
to provide the optimum service to the subscribers in
a system, the present invention encompasses the
configuration as illustrated in Fig. 2. A typical
35

- 17 -

1 CATV system includes a head end 52 at which the
transmitted program originates and which in turn
transmits the programs on the various channels by
way of land lines 14. In the preferred embodiment
5 as illustrated in Fig. 2, land lines 14 are further
designated to include a plurality of sections of
which sections 54 and 56 are illustrated. Each sec-
tion 54, 56 includes a respective subset 58 and 60
of receivers respectively coupled thereto. Each
10 section 54, 56 and so forth is respectively coupled
to the remaining portions of land lines 14 at a
respective node or juncture 62, 64.

In the preferred embodiment of the present
invention, a central unit is provided for each
15 subsection. Two such central units 12 and 66 are
illustrated and are respectively coupled via lines
68 and 70 with respective sections 54 and 56.
Furthermore, respective blocking devices 72 and 74
are provided at junctures 62 and 64 respectively.

20 Blocking devices 72 and 74 are preferably
low pass filters which allow transmissions from head
end 52 transmitted at the lower frequency channels
to pass unimpeded therethrough. Viewer-chosen
programming is preferably transmitted at the higher
frequency channels directly to the respective sec-
25 tions 54, 56. Blocking devices 72 and 74 prevent
transmission of these higher frequency channels
beyond their respective sections so that they do not
interfere with one another. That is to say, each
program unit 12 and 66 can broadcast viewer-chosen
30 programs on the same channel frequencies but the
sections are isolated from one another by the block-
ing devices.

Sections of land lines 14 can be identi-
fied and designated as desired by the proper place-

35

- 18 -

1 ment of a blocking device such that each program
unit can adequately serve the program requests of
the viewers associated with the subset of receivers
5 included in each subsection. For example, if a CATV
system has 50,000 subscribers, and it is determined
that fifty channels can adequately satisfy the
viewer-chosen program requests of 10,000 viewers,
10 five sections of 10,000 receivers each would be
designated with a blocking device installed at the
junction between each designated section and the
remaining portions of the land lines. In this way,
transmissions produced by separate central units on
the same channels to separate sections would not
15 interfere with one another. This arrangement effec-
tively multiplies the number of available channels
for viewer-chosen programs.

As preferred, central units 12, 66 and so
forth, are located in physical proximity with head
end 52 to take advantage of already existing equip-
20 ment. It should be appreciated, however, that even
with multiple central units, multiple scheduling
computers, billing, and address computers may not be
needed. That is to say, a single set of appropri-
ately selected computers can serve all of the cen-
tral units. Additionally, economy of a scale may
25 dictate that all of the central units use a common
program collection 20 in order to minimize the size
of the inventory. Furthermore, the various program
units may also share a common set of incoming tele-
phone lines for communicating with requesting view-
30 ers.

As an alternative, however, and depending
upon the configuration of the CATV network and the
economics involved, it may be desirable to locate a
totally independent and free-standing program unit

- 19 -

1 physically adjacent its associated section of the
land lines or physically adjacent another location
such as the central administrative office of the CATV
transmission system. That is to say, those skilled
5 in the art will appreciate that the physical location of the program unit and whether multiple program units can use common equipment is a matter of design choice dictated by technology, economics, and so forth.

10 Those skilled in the art will also appreciate that blocking devices 62, 64, and so forth may include distribution repeaters or amplifiers which are designed to amplify the frequency channels emanating from head end, but by their nature inherently block passage of the higher frequency channels
15 from the various sections to the remaining portions of land lines 14. This can be implemented by coupling line 68, immediately "downstream" of the repeater nearest juncture 62. Other repeaters downstream of this blocking repeater receive and amplify all
20 the incoming transmissions including the transmissions from the head end and those injected at juncture 62.

As should now be apparent from the description above, the present invention allows a
25 requesting viewer to choose a program for viewing at a requested time on the television receiver associated with the requesting viewer. The convenience provided thereby eliminates the need for the viewer to drive to a video store to pickup a chosen movie
30 on video tape and to again repeat the trip to return the movie.

Additionally, the present invention minimizes the risk that the viewer will be unable to view the chosen program at the viewer requested

- 20 -

1 time. This risk is minimized for two reasons.
First, the preferred embodiment hereof designates
sections of the land lines which are matched from a
capacity standpoint with its associated program unit
5 in order to satisfy the demands of the viewers
associated therewith. Secondly, the present inven-
tion allows as many viewers as are connected to the
system to choose the same program at the same time.
This is because once the chosen program is scheduled
10 for transmission on a particular channel, additional
viewers can be added simply by transmitting the
appropriate descrambling signals to the requesting
viewer's receiver. In this way, many viewers can
choose the currently most popular program rather
15 than just a few as determined by the number of
cassette copies available as with prior art video
stores.

The present invention also avoids the need
for premium rental space in which to store a large
inventory of programs and eliminates the many dupli-
20 cations of inventory carried by the many video
stores in a territory.

Having thus described the preferred em-
bodiments of the present invention, the following is
claimed as new and desired to be secured by Letters
25 Patent:

30

35

- 21 -

1

Claims

5

10

1. A method of operating a television transmission system using land lines for transmitting television programs for reception by a plurality of receivers coupled with land lines for viewing the programs on the receivers by viewers respectively associated therewith, the system including means for selectively preventing intelligible viewing of certain programs by certain receivers, said method comprising the steps of:

15

providing a collection of stored programs stored on a medium allowing selective reproduction and real-time transmission of said stored programs over the land lines;

20

selecting a prospective chosen program from said collection for transmission at a requested time in response to a request therefor from a requesting viewer;

transmitting said chosen program in real-time over the land lines at said requested time for reception by and viewing on a receiver associated with said requesting viewer; and

25

preventing intelligible viewing of said chosen program at said requested time on receivers other than said receiver associated with said requesting viewer.

30

35

- 22 -

1 2. The method as set forth in claim 1,
the system including --

scrambler means operably coupled with said land
lines for selectively scrambling the
5 transmission of certain of the program
transmissions in order to prevent intelli-
gible viewing thereof on the receivers,

a plurality of control units respectively
corresponding to and operably associated
10 with the receivers and operably coupled
with the land lines, each control unit
being operable for receiving decoder
signals and in response thereto for selec-
tively descrambling certain ones of the
15 program transmissions for allowing intel-
ligible viewing thereof on the associated
receiver, and

decoder signal means operably coupled with the
land lines and operable for selectively
20 transmitting decoder signals for reception
by the receivers in order to allow intel-
ligible viewing of certain ones of the
programs on selected ones of the receiv-
ers, said method further including the
steps of --

25 scrambling the transmission of said chosen
program in order to prevent intelligible
viewing thereof on the receivers, and

transmitting decoder signals for receipt by
said receiver associated with said re-
30 questing viewer in order to allow intel-
ligible viewing of said chosen program
thereon.

35

- 23 -

1 3. The method as set forth in claim 1,
the system including means for simultaneously trans-
mitting a plurality of programs on a respective
plurality of identifiable channels, the receivers
5 being operable for tuning to a selected channel,
said method further including the steps of --
transmitting said chosen program during said
requested time over a selected channel,
and
10 communicating the identity of said selected
channel only to said requesting viewer.

15

20

25

30

35

- 24 -

1 4. The method as set forth in claim 2,
the system including means for transmitting a plu-
rality of programs on a respective plurality of
identifiable channels, the control units being oper-
5 able for tuning to a selected channel, the decoder
signals including address signals respectively
specific to the control units and descrambler sig-
nals respectively associated with the address sig-
nals and respectively specific to identify selected
10 transmissions each control unit being responsive to
specific address signals and the descrambler signals
associated therewith for descrambling program trans-
missions on the channels identified by the descram-
bler signals, said method further including the
steps of --

15 selecting a channel for transmission,
transmitting said chosen program during said
requested time on said selected channel,
communicating the identity of said selected
channel only to said requesting viewer,
20 transmitting address signals specific to the
control unit associated with the request-
ing viewer's receiver and transmitting
associated descrambler signals specific to
identify said selected channel.

25

30

35

- 25 -

1 5. The method as set forth in claim 1,
further including the steps of --
 identifying a section of the land lines having
 a subset of receivers operably coupled
5 thereto wherein said subset includes a
 plurality of receivers less than the total
 number of receivers included in the sys-
 tem, and remaining portions of the land
 lines having a plurality of receivers
10 other than said subset coupled thereto,
 transmitting said chosen program over said
 section of the land lines,
 identifying a juncture between said section and
 said remaining portion, and
15 preventing transmission of said chosen program
 beyond the juncture from said section to
 said remaining portion by use of a block-
 ing device located at said juncture.

20 6. The method as set forth in claim 1,
further including the steps of --
 providing computer means operable for receiving
 from said requesting viewer encoded sig-
 nals representative of said chosen pro-
 gram, said requested time, and the iden-
25 tity of said receiver associated with said
 requesting viewer,
 said selecting step including the step of
 selecting said chosen program from said
 collection in response to said encoded
30 signals from said requesting viewer.

 7. The method as set forth in claim 1,
said encoded signals including telephone touch-tone
signals.

35

- 26 -

1 8. The method as set forth in claim 6,
further including the step of providing said comput-
er means with voice interaction capability and using
said computer for providing voice communication to
5 said requesting viewer.

 9. The method as set forth in claim 1,
further including the steps of providing scheduling
computer means operable for scheduling multiple
10 program choices and multiple requested times.

 10. The method as set forth in claim 9,
further including the steps of --
 providing computer means for providing billing
 information correlated with the requesting
15 viewer's chosen program, and
 providing a bill to said requesting viewer
 corresponding to said chosen program.

 11. The method as set forth in claim 1,
20 further including the step of providing electronic
memory means having said collection stored therein.

 12. The method as set forth in claim 1,
the land lines including coaxial cables.
25

 13. The method as set forth in claim 1,
the land lines including fiber optic cables.
30

35

- 27 -

1 14. In a television transmission system
using land lines for transmitting programs for
reception by a plurality of television receivers
coupled with the land lines for viewing of the
5 programs on the receivers by viewers respectively
associated therewith, and including communicating
means for communicating information as encoded
signals over the land lines from said viewers, the
improvement comprising:

10 a collection of stored programs stored on a
medium allowing selective reproduction and
real-time transmission over the land lines
for reception and viewing thereof by
selected receivers;

15 computer means operably coupled with the com-
municating means for receiving encoded
signals from a requesting viewer, said
encoded signals being representative of a
requesting viewer's choice of a program
chosen from said collection and said
20 requesting viewer's requested time for
viewing of said chosen program on a re-
ceiver associated with said requesting
viewer and for providing output informa-
tion representative thereof;

25 selecting means operably associated with said
collection and said computer means and
responsive to said output information for
selecting said chosen program from said
collection; and

30 transmitting means operably associated with and
responsive to said selecting means for
transmitting said chosen program over the
land lines at said requested time for
reception by and viewing on said request-
35 ing viewer's receiver.

- 28 -

1

5

15. The apparatus as set forth in claim 14, the communicating means including telephone lines, the encoded signals including touch-tone signals, said computer means including means for providing voice communication to said requesting viewer over the telephone lines.

10

15

16. The apparatus as set forth in claim 15, the system including means for transmitting programs on a respective plurality of channels, said computer means including means for scheduling one of the channels for transmission of said chosen program thereon and including means for providing voice communication over the telephone lines identifying the channel on which said chosen program is to be transmitted to the requesting viewer.

20

25

30

35

- 29 -

1 17. In a television transmission system
using land lines for transmitting programs for
reception by a plurality of television receivers
coupled with land lines for viewing of the programs
5 on the receivers by viewers respectively associated
therewith, the system further including communicat-
ing means for receiving information over land lines
from the viewers, the land lines including a section
thereof having a subset of the receivers coupled
10 therewith wherein said subset includes a plurality
of receivers less than the total number of receivers
included in the system, the remaining portion of the
land lines having a plurality of receivers other
than the subset coupled therewith, the section and
15 the remaining portion being coupled with one another
at a juncture, the improvement comprising:

 a collection of stored programs stored on a
 medium allowing selective reproduction and
 real-time transmission thereof over the
land lines for reception and viewing
20 thereof by selected receivers;

 receiving means operably associated with the
communicating means for receiving informa-
tion from a requesting viewer, said informa-
tion including a requesting viewer's
25 choice of a program chosen from said
collection and a requested time for view-
ing of said program on a receiver associ-
ated with said requesting viewer, said
associated receiver being included in the
30 subset of receivers;

 selecting means operably associated with said
collection and operably associated with
and responsive to said receiving means for

35

- 30 -

1 selecting said chosen program from said
 collection;
 transmitting means operably associated with
 said selecting means and coupled with the
5 subsection of the land lines for transmis-
 sion of said chosen program at said re-
 quested time for reception by and viewing
 one on said associated receivers; and
 blocking means located in the vicinity of the
10 juncture for preventing transmission of
 the chosen program therebeyond from the
 section into the remaining portions of the
 land lines.

15 18. The apparatus as set forth in claim
17, the system including means for simultaneously
transmitting selected programs over a respective
plurality of channels included in a specified group
of channels,

20 said transmitting means including means for
transmitting said chosen program on a
selected channel other than the channel
included in said selected group of chan-
nels,

25 said blocking means including structure allow-
ing passage of programs being transmitted
on the channels included in the selected
group and structure for preventing passage
of transmissions on said selected channel
30 from the section to the remaining portion
of the system.

35

- 31 -

1 19. The apparatus as set forth in claim
18, said selected channel being at a relatively
higher frequency than the channels in the specified
group.

5

10

15

20

25

30

35

1 / 2

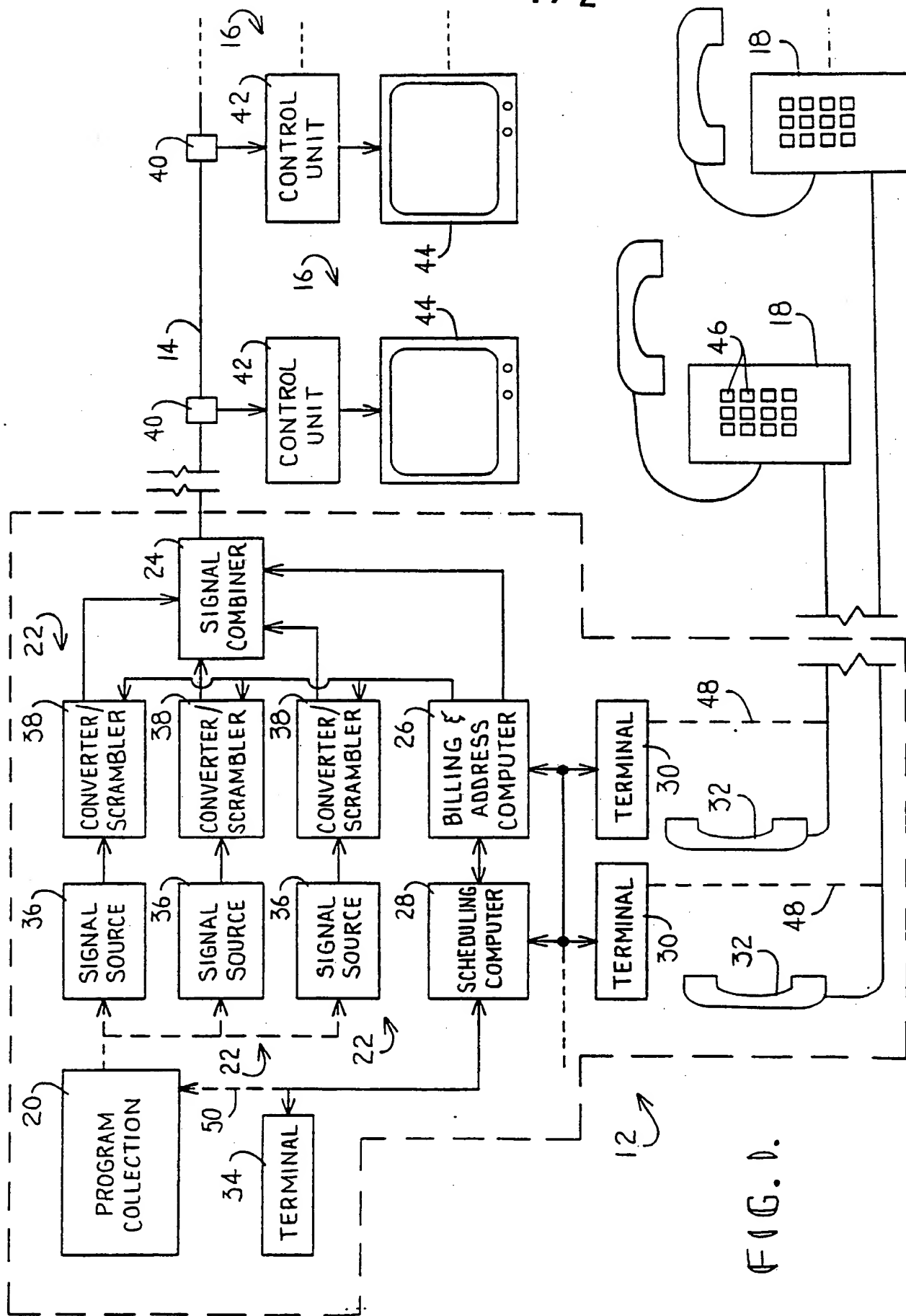


FIG. 1.

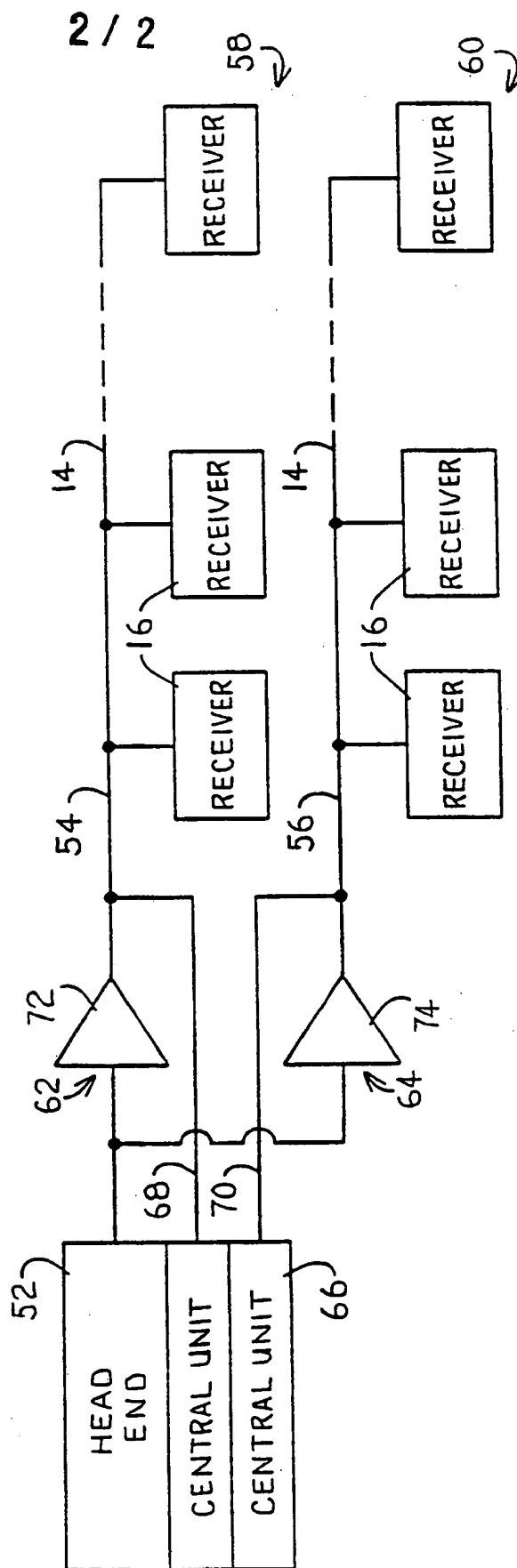


FIG. 2.

INTERNATIONAL SEARCH REPORT

International Application No PCT/US89/02507

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³

According to International Patent Classification (IPC) or to both National Classification and IPC

INT. CL.⁴ H04N 7/167

U.S. CL. 380/10

II. FIELDS SEARCHED

Minimum Documentation Searched ⁴

Classification System ¹

Classification Symbols

U.S. 358/85,86
380/3,5,7,10
455/3,4,5,6

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched ⁴

III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴

Category ⁸ | Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷ | Relevant to Claim No. ¹⁸

A	US, A, 4,251,691 Published 17 February 1981, Kakiyara et al.	1,14,17
Y	US, A, 4,381,522 Published 26 April 1983, Lambert, abstract.	1-19
A	US, A, 4,710,955 Published 01 December 1987, Kauffman.	1,14,17
A,P	US, A, 4,761,684 Published 02 August 1988, Clark et al.	1,14,17
Y,P	US, A, 4,763,191 Published 09 August 1988, Gordan et al., abstract.	1-19
A,P	US, A, 4,785,472 Published 15 November 1988, Shapiro.	1,14,17

* Special categories of cited documents: ¹⁵

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search ²

Date of Mailing of this International Search Report ²

08 August 1989

06 SEP 1989

International Searching Authority ¹

Signature of Authorized Officer ¹⁹

ISA/US

Bernarr Earl Gregory

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, ¹ with indication, where appropriate, of the relevant passages ²	Relevant to Claim No ¹
------------	--	-----------------------------------

Y, P	US, A, 4,792,849 Published 20 December 1988, Mc Calley et al., abstract.	1-19
------	---	------

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.